

In the Claims:

1-20. (Cancelled).

21. (Previously Presented) A process for producing a multiplicity of microfluidic arrangements from a plate-shaped composite structure comprised of two plates which are two-dimensionally and fixedly joined to each other and which have generally planar surfaces, and a multiplicity of recurring groove structures, the dimensions of which are within a micrometer range and which form flow channels disposed in a surface of at least one of the plates which is joined to a facing surface of the other of the plates,

comprising the steps of:

producing the groove structures of the plate-shaped composite structure so that they are continuously joined to each other in at least one direction from one edge to an opposite edge of the plate-shaped composite structure,

before mechanical machining, at least partially filling the groove structures of the plate-shaped composite structure with a filling medium such that at least openings or portions of the groove structures to be opened by mechanical machining are filled with the filling medium, the filling medium being selected so that it will not be removed from the groove structures either by the mechanical machining itself or by aids used during mechanical machining,

wherein the plate-shaped composite structure is mechanically machined along lines which extend between the groove structures so that thereafter the microfluidic arrangements in the composite structure are individually or group-wise separated from each other, and

removing the filling medium from the groove structures of the microfluidic arrangements after said mechanical machining.

22. (Previously Presented) A process according to claim 21, wherein said filling medium is at least one of immiscible with and not dissolved by a cooling lubricant used for said mechanical machining.

23. (Previously Presented) A process according to claim 21, wherein the filling medium is in liquid form during filling of the groove structures.

24. (Previously Presented) A process according to claim 21, wherein a filling medium is used which is present in a solid state of aggregation during mechanical machining.

25. (Previously Presented) A process according to claim 24, wherein the filling medium is introduced into the groove structures at a temperature which is significantly higher than the normal temperature which is in a range of 2° C to 120° C.

26. (Previously Presented) A process according to claim 24, wherein the filling medium is introduced into the groove structures at a temperature which is significantly higher than the normal temperature which is in a range between about 5°C and about 280°C.

27. (Previously Presented) A process according to claim 21, wherein alcohols, mono- and polyhydric polyalcohols, fatty acids, saturated and unsaturated esters of fatty acids or a mixture of these substances are used as the filling medium.

28. (Previously Presented) A process according to claim 21, wherein, before the filling medium is introduced into the groove structure, the composite structure is evacuated and filling is effected under vacuum.

29. (Previously Presented) A process according to claim 28, wherein said filling is effected at a residual pressure of less than about 250 mbar.

30. (Previously Presented) A process according to claim 29, wherein the filling medium is in liquid form during filling of the groove structures, and wherein, after the filling medium is introduced into the groove structure, the plate-shaped composite structure is brought to ambient pressure and the filling medium solidified.

31. (Previously Presented) A process according to claim 21, wherein the step of removing the filling medium from the groove structures is performed at an elevated temperature.

32. (Previously Presented) A process according to claim 21, wherein the step of removing the filling medium from the groove structures is effected by dissolving the filling medium in a solvent and sparging the filling medium/solvent mixture.

33. (Previously Presented) A process according to claim 32, wherein an alcohol or an ether is used as the solvent.

34. (Previously Presented) A process according to claim 21, wherein the filling medium is removed after the microfluidic arrangements have been cleaned following mechanical machining.

35. (Previously Presented) A process according to claim 21, wherein said mechanical machining forms grooves in the composite structure which cut through only one of the two plates.

36-40. (Cancelled).